



Test Report: RID-65A

65W Dual Output Switching Power Supply

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

■ RELIABILITY TEST

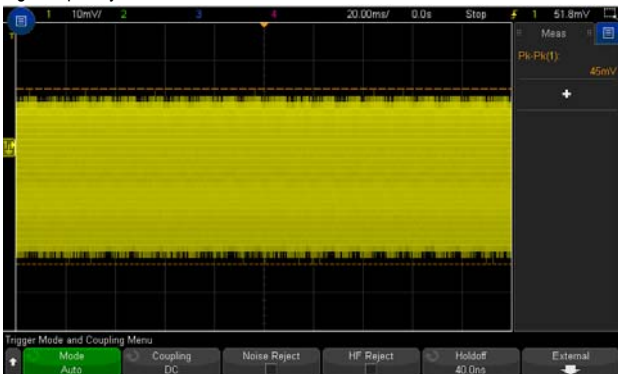
ENVIRONMENT TEST

DESIGN VERIFY TEST

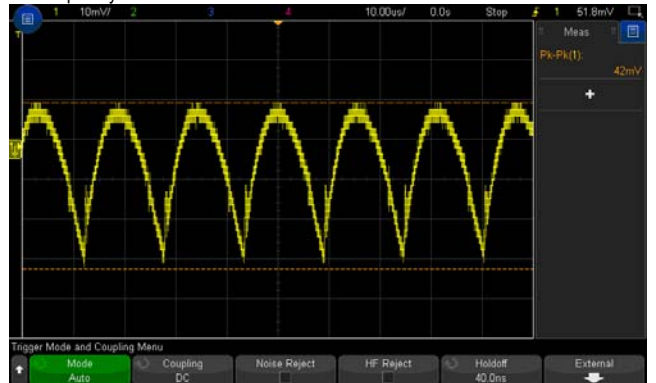
OUTPUT FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|-------------------------------|------------------------------------|---|---|
| 1 | OUTPUT VOLTAGE ADJUST RANGE | CH1: 4.75V~ 5.5 V | I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C | 4.62V~5.73V/230VAC 4.62V~5.73V /115VAC |
| 2 | OUTPUT VOLTAGE(Max) TOLERANCE | V1 : -2%~2 % V2 : -8%~8 % | I/P: 88VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C | V1 : -0.06%~0.06% V2 : -0.05%~0.72% |
| 3 | LINE REGULATION (Max) | V1: -0.5%~ 0.5% V2: -1.5%~ 1.5% | I/P: 88VAC~ 264VAC O/P:FULL LOAD Ta:25°C | V1 : -0.01%~0.01% V2 : -0.03%~0.03% |
| 4 | LOAD REGULATION(Max) | V1: -0.5%~0.5% V2: -5%~5% | I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C | V1 : -0.05%~0.06% V2 : -0.37%~1.70% |
| 5 | OVER/UNDERSHOOT TEST | < ±10% | I/P: 230VAC O/P:FULL LOAD Ta:25°C | 1.2% |
| 6 | RIPPLE & NOISE(Max) | V1: 80mVp-p V2: 120mVp-p | I/P:230VAC O/P:FULL LOAD Ta:25°C | V1: 45mVp-p V2: 24mVp-p |

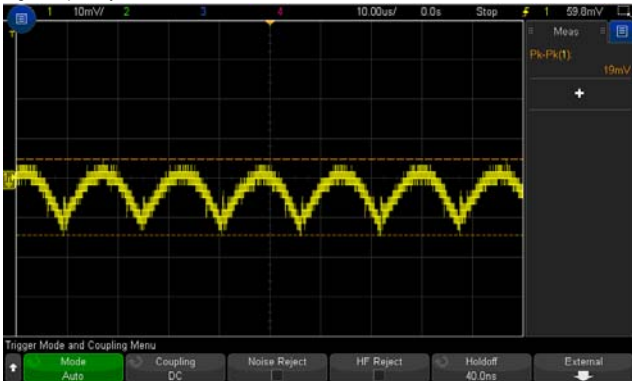
high frequency (V1) :



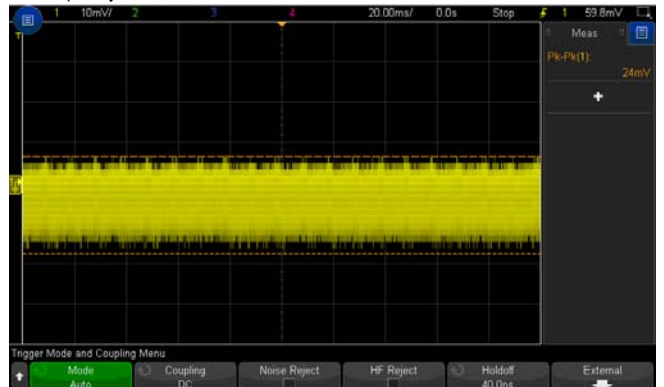
low frequency (V1):



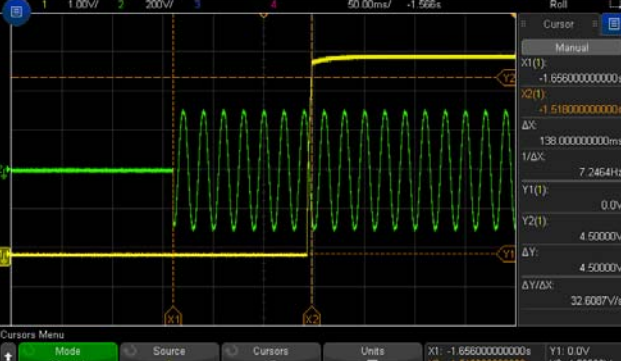
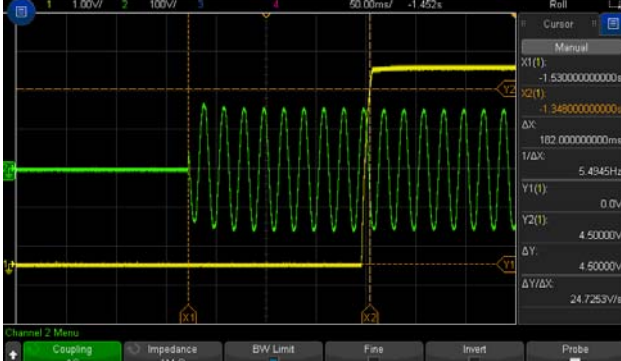
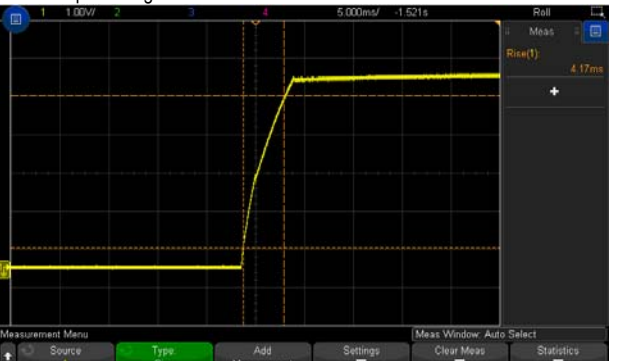
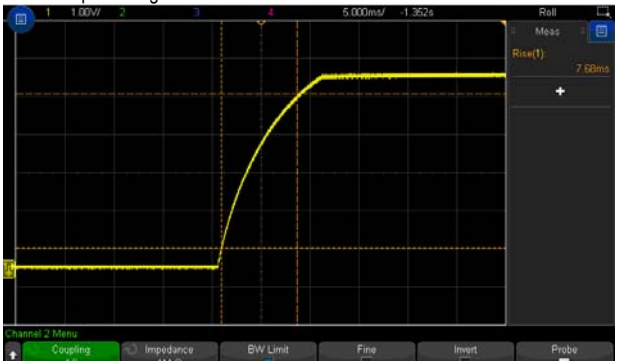

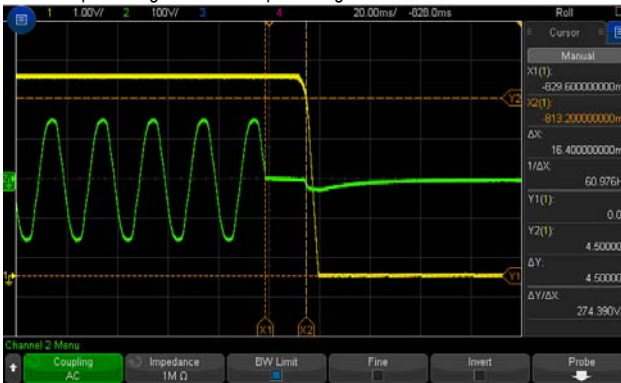
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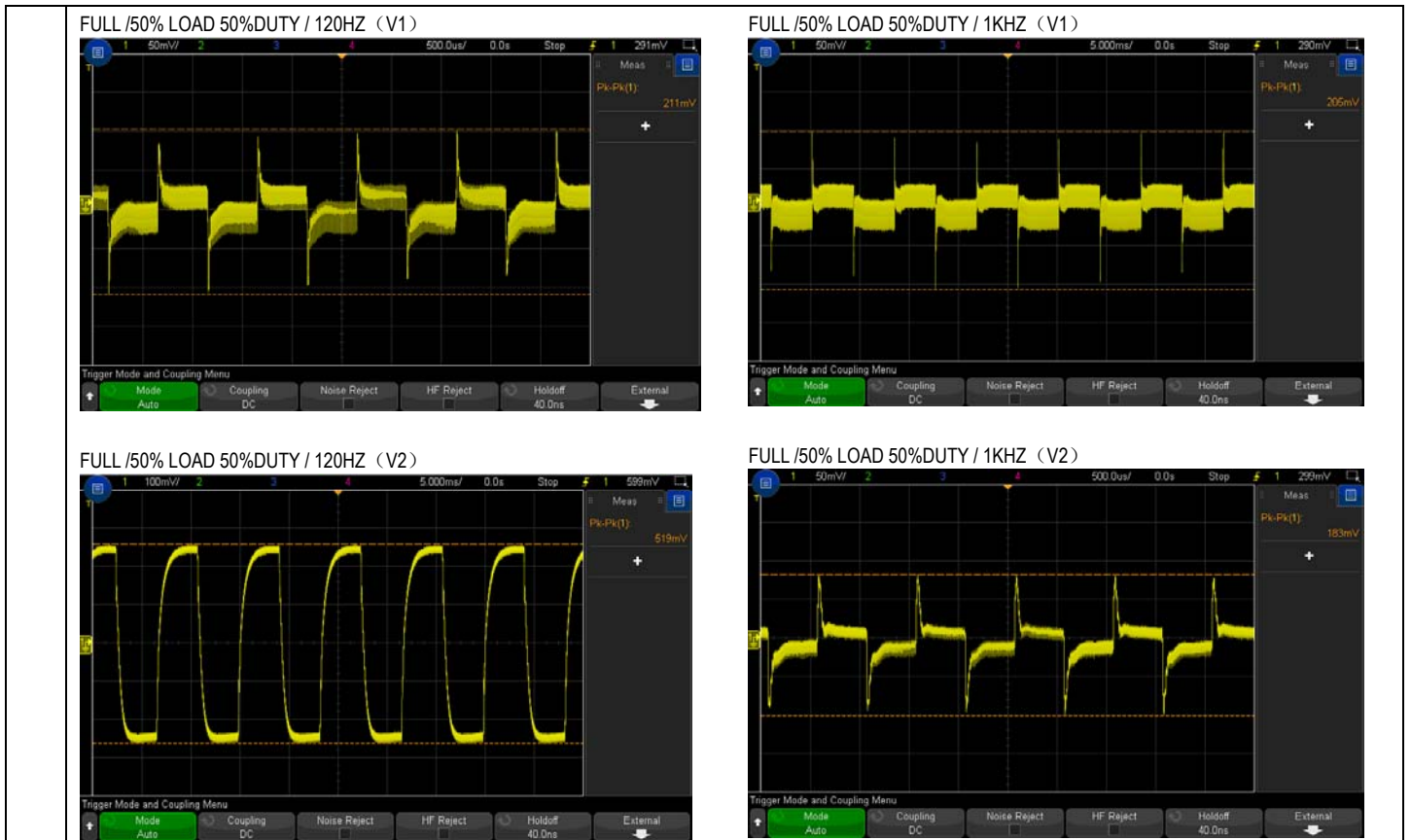


low frequency (V2) :



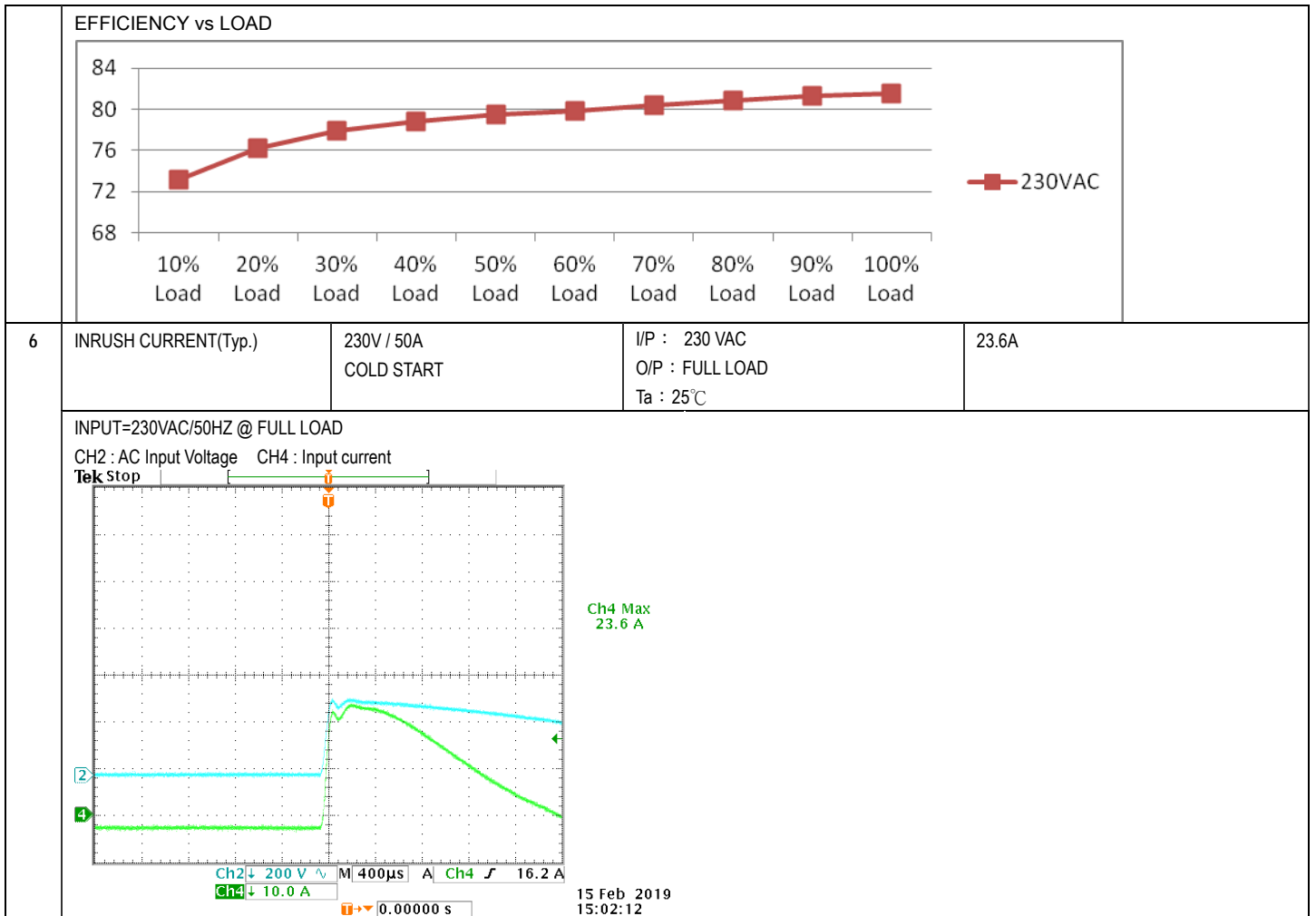
| | | | | |
|---|------------------|-------------------------------|--|---------------------------------|
| 7 | SET UP TIME(Max) | 230VAC/500ms 115VAC/1200ms | I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | 230VAC/ 138 ms 115VAC/ 182ms |
|---|------------------|-------------------------------|--|---------------------------------|

| | | | |
|------------------------------|--|--|---|
| | <p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>  | | <p>INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>  |
| <p>8 RISE TIME (Max)</p> | <p>230VAC/20ms 115VAC/30ms</p> | <p>I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C</p> | <p>230VAC/4.17ms 115VAC/7.68ms</p> |
| | <p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage</p>  | | <p>INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage</p>  |
| <p>9 HOLD UP TIME (Typ.)</p> | <p>230VAC/50ms 115VAC/12ms</p> | <p>I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C</p> | <p>230VAC/ 81.8ms 115VAC/ 16.4ms</p> |
| | <p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>  | | <p>INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>  |
| <p>10 DYNAMIC LOAD</p> | <p>V1: 1000 mVp-p V2: 1200 mVp-p</p> | <p>I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C</p> | <p>(1) (2) V1: 211mVp-p 205mVp-p V2: 519mVp-p 183mVp-p</p> |



INPUT FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|-----------------------|--------------------------|---|--------------------------------------|
| 1 | INPUT VOLTAGE RANGE | 88VAC~264VAC | I/P:TESTING O/P:FULL LOAD Ta:25°C | 74V~264V |
| | | | I/P: LOW-LINE-3V=85 V HIGH-LINE+15%=300 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE) | TEST: OK |
| 2 | INPUT FREQUENCY RANGE | 47HZ ~63 HZ NO DAMAGE | I/P:88 VAC ~264 VAC O/P:FULL~MIN LOAD Ta:25°C | TEST: OK |
| 3 | INPUT CURRENT (Typ.) | 230V/ 1.2A 115V/ 2A | I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | I =0.64A/ 230VAC I =1.03A/ 115VAC |
| 4 | LEAKAGE CURRENT | <2 mA / 240 VAC | I/P : 240 VAC O/P : Min LOAD Ta : 25°C | 0.3 mA |
| 5 | EFFICIENCY(Typ.) | 80% | I/P:230 VAC O/P:FULL LOAD Ta:25°C | 81.5% |



PROTECTION FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|-------------------------|--|---|--|
| 1 | OVER LOAD PROTECTION | 110%~150% | I/P: 264VAC I/P: 230VAC I/P: 115VAC O/P: TESTING Ta: 25°C | 118.1%/ 264VAC 123.6%/ 230VAC 121.5%/115VAC PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed |
| 2 | OVER VOLTAGE PROTECTION | 5.75V~6.75V | I/P: 264VAC I/P: 230VAC I/P: 88VAC O/P: MIN LOAD Ta: 25°C | 5.94V/ 264VAC 5.94V/ 230VAC 5.94V/ 88VAC PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed |
| 3 | SHORT PROTECTION | SHORT EVERY OUTPUT 1 HOUR NO DAMAGE | I/P: 264VAC I/P: 88VAC O/P: FULL LOAD Ta: 25°C | NO DAMAGE PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed |

COMPONENT STRESS TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|---|---|--|---|
| 1 | PWM Transistor (D to S) or (C to E) Peak Voltage | Q1 Rated : 600 V | AC ON/OFF I/P:High-Line +3V =267V VDS: O/P: (1)Full Load (2)Output Short (3) Full Load Continue Ta:25°C | VDS: (1) 544V (2) 572V (3) 536V |
| 2 | O/P Diode | D50 Rated : 200 V D55 Rated : 40 V | AC ON/OFF I/P:High-Line +3V =267 V O/P: (1)Full Load (2)Output Short (3) Full Load Continue Ta:25°C | D50 D55 (1) 91.4V (1) 36.7V (2) 78.5V (2) 34.3V (3) 89.5V (3) 36.3V |
| 3 | Input Capacitor Voltage | C5 Rated :150 μ / 400 V | I/P:High-Line +3V =267V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change (4)Full load continue Ta:25°C | (1) 387V (2) 371V (3) 371V (4) 371 V |
| 4 | Control IC Voltage Test | U1 Rated : 7.2V~ 16 V | AC ON/OFF I/P:High-Line +3V =267 V O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. (5)NO LOAD VRmin(LOW LINE) Ta:25°C | (1) 12.7V (2) 12.7V (3) 12.7V (4) 12.7V (5) 9.4V |
| 5 | Clamp Diode Peak Voltage | D1 Rated :600 V | AC ON/OFF I/P : High-Line +3V = 267 V O/P : (1) Dynamic Load 90%Duty/1KHz (2)Full load continue Ta : 25°C | (1) 544V (2) 540V |

SAFETY TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|----------------------|--|---|--|
| 1 | WITHSTAND VOLTAGE | I/P-O/P: 3KVAC/min I/P-FG:2 KVAC/min O/P-FG: 0.5KVAC/min | I/P-O/P: 3.6 KVAC/min I/P- FG: 2.4 KVAC/min O/P - FG: 0.6 KVAC/min Ta:25°C | I/P-O/P:6.14mA I/P-FG:8.35mA O/P-FG:4.61mA NO DAMAGE |
| 2 | ISOLATION RESISTANCE | I/P-O/P:500VDC>100M Ω I/P- FG:500VDC>100M Ω O/P- FG:500VDC>100M Ω | I/P-O/P: 600 VDC I/P- FG: 600 VDC Ta:25°C | I/P-O/P: 9999M Ω I/P-FG: 9999M Ω O/P-FG: 9999M Ω NO DAMAGE |
| 3 | GROUNDING CONTINUITY | FG(PE) TO CHASSIS OR TRACE < 100 m Ω | 40 A / 2min Ta: 25°C/70%RH | 5 m Ω |



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|----|---|---|---|---|
| 2 | OVER LOAD BURN-IN TEST | NO DAMAGE 1 HOUR (MIN) | I/P : 230 VAC O/P : 129% LOAD Ta : 25°C | TEST : OK |
| 3 | LOW TEMPERATURE TURN ON TEST | TURN ON AFTER 2 HOUR | I/P : 264VAC/115VAC O/P : 100 % LOAD Ta= -25°C | TEST : OK |
| 4 | HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST | AFTER 12 HOURS IN CHAMBER ON CONTROL45°C /95 %R.H NO DAMAGE | I/P : 272 VAC O/P : FULL LOAD Ta=45 °C HUMIDITY= 95 %R.H | TEST : OK |
| 5 | TEMPERATURE COEFFICIENT | ± 0.03%/°C (0~50°C) | I/P : 230 VAC O/P : FULL LOAD | ± 0.0067%/°C (0~50°C) |
| 6 | STORAGE TEMPERATURE TEST | 1. Thermal shock Temperature : -45°C~ +90°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : STATIC | | TEST : OK |
| 7 | THERMAL SHOCK TEST | 1. Thermal shock Temperature : -30°C~ +50°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16 CYCLE 5. Input/Output condition : 15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:230V/ FULL LOAD Burn In Test | | TEST : OK |
| 8 | VIBRATION TEST | 1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 5G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C | | TEST : OK |
| 9 | CAPACITOR LIFE CYCLE | SUPPOSE C56 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta=45 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta=45 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 45 °C LIFE TIME | | (1) 131104.2HRS (2) 38441.7HRS (3) 77872 HRS (4) 141212.5HRS |
| 10 | MTBF | Conducted by Parts Stress Analysis Prediction 265.9K hrs min. MIL-HDBK-217F (25°C) | | |
| 11 | Ongoing Reliability Test | I/P : 230VAC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 30,000 hours | | |

| TEST RESULT | TESTER | REVIEW | APPROVAL |
|-------------|--------|--------|----------|
| PASS | LIUTT | | Wangdz |

2018.4.30 GP-A50-F010